AIRCRAFT ENGINE MOUNT WITH SINGLE THRUST LINK

BACKGROUND OF THE INVENTION

This invention relates generally to aircraft engines and more particularly to mounts for supporting an engine on an aircraft.

An aircraft engine may be mounted to an aircraft at various locations such as the wings, fuselage or tail. The engine is typically mounted at both its forward and aft ends by corresponding forward and aft mounts for carrying various loads to the aircraft. The loads typically include vertical loads such as the weight of the engine itself, axial loads due to the thrust generated by the engine, lateral loads such as those due to wind buffeting, and roll loads or moments due to rotary operation of the engine. The mounts must also accommodate both axial and radial thermal expansion and contraction of the engine relative to the supporting pylon.

One exemplary mounting system includes a forward mount having a pair of circumferentially spaced apart links. Each link is joined at one end to the aircraft and at the other end to a casing in the engine. The links transfer in-plane loads, i.e. those in a single vertical axial plane extending perpendicularly to the engine centerline axis, from the engine to the aircraft through tension and compression thereof. The mount can thus accommodate vertical loads and lateral or horizontal loads.

The exemplary mounting system further includes an aft mount, having a pair of circumferentially spaced apart links. Each of these links is also joined at one end to the aircraft and at the other end to an engine casing. The aft mount further includes a pair of thrust links for reacting thrust generated by the engine. Each thrust link is joined at one end to the aircraft and is joined at the other end to engine casing. The two ends are spaced axially with respect to the engine such that the links react engine thrust in compression or tension. This system utilizes two thrust links to provide thrust loadpath failsafe protection. That is, if the loadpath of one of the two thrust links becomes damaged, the other thrust link picks up the entire thrust load. While generally operating in a satisfactory manner, this system requires two thrust links, two thrust yokes, a thrust balancing whiffle tree, additional lug joints and associated hardware. This results in a relatively complex mounting system having a large number of parts, high cost and increased weight penalty. Accordingly, it would be desirable to have an aircraft engine mount that is able to provide thrust loadpath failsafe protection without using two thrust links.

BRIEF SUMMARY OF THE INVENTION

The above-mentioned need is met by the present invention, which provides an aircraft engine mount including a mounting frame having first and second flanges spaced apart a predetermined distance. Each of the first and second flanges has a bolt hole formed therein. A single thrust link is connected at one end to the mounting frame and at another end to the engine and serves as the primary axial loadpath for the engine. A lug formed on the engine casing is disposed between the first and second flanges and has a thickness that is less than the distance between the first and second flanges. The lug also has a bolt hole formed therein. A bolt extends through the bolt holes in the first and second flanges and the lug to connect the lug to the first and second flanges. The bolt hole in the lug is larger in diameter than the bolt to allow the lug to slide axially along the bolt. The first and second flanges, the lug and the bolt provide a waiting failsafe arrangement for reacting axial loads upon failure of the single thrust link.

The present invention and its advantages over the prior art will become apparent upon reading the following detailed description and the appended claims with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The subject matter that is regarded as the invention is particularly pointed out and distinctly claimed in the concluding part of the specification. The invention, however, may be best understood by reference to the following description taken in conjunction with the accompanying drawing figures in which:

FIG. **1** is a schematic side view of an aircraft engine mounting system.

FIG. **2** is an axial cross-sectional view showing the mounting system of FIG. **1** in more detail.

FIG. **3** is a perspective view of the forward mount from the mounting system of FIG. **1**.

FIG. **4** is a perspective view of the aft mount from the mounting system of FIG. **1**.

FIG. **5** is an enlarged axial cross-sectional view showing a waiting failsafe arrangement from the aft mount in detail.

FIG. **6** is a forward-looking-aft view of an engine lug from the waiting failsafe arrangement.

DETAILED DESCRIPTION OF THE INVENTION

Referring to the drawings wherein identical reference numerals denote the same elements throughout the various views, FIG. **1** schematically shows an exemplary turbofan gas turbine engine **10** having a longitudinal or axial centerline axis **12** mounted below an aircraft wing **14**. The wing **14** includes a pylon **16**, and the engine **10** is mounted to the pylon **16** by a mounting system comprising a forward mount **18** and an aft mount **20** spaced axially downstream from the forward mount **18**. Although the engine **10** is shown as being mounted in a top mounted installation, this is only for purposes of illustration. It will be understood from the following description that the present invention is equally applicable to mounting system components that are used in any type of engine installation, including side mounted and bottom mounted installations. Accordingly, the present invention is not limited to wing-mounted engines, but can also be used with fuselage and tail-mounted engines. Furthermore, the present invention is not limited to turbofan engines, but can be used with other types of engines such as turboshaft and turboprop engines.

FIG. **2** shows the gas turbine engine **10** in more detail. As is known in the art, the engine **10** includes a fan section **22**, a compressor section **24**, a combustor section **26** and a turbine section **28**, arranged in order, in axial flow relationship. The compressor section **24**, combustor section **26** and turbine section **28** are commonly referred to collectively as the core engine. A portion of the air entering the engine **10** passes through the fan section **22** and the compressor section **24**, and is pressurized in each section. The compressed air exiting the compressor section **24** enters the combustor section **26** where it is mixed with fuel and burned to provide a high energy gas stream. This high energy gas stream is expanded in the turbine section **28**. The energy extracted by the expansion of the high energy gas stream in the turbine